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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,579

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Eiichi Kaji

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WENDEROTH, LIND & PONACK, L.L.P.

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EXAMINER

LU, C CAIXIA

ART UNIT

PAPER NUMBER

1796

MAIL DATE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/593,579	<b>Applicant(s)</b> KAJI ET AL.	
	<b>Examiner</b> Caixia Lu	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4,5,8 and 9 is/are pending in the application.
- 4a) Of the above claim(s) 4,5,8 and 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 20, 2009 together with the Response filed June 19, 2009 has been entered.

### ***Specification***

2. The disclosure is objected to because of the following informalities: in the Amendment to the Specification filed September 20, 2006, the amendment of page 18 by replacing "polymethylaluminum" with the identical term does not make sense.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in

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the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

A. Limitation (i) of claim 1

In (i) of claim 1, the limitation of “a mole fraction of methyl groups originating from trimethylaluminum, relative to the total moles of methyl groups existing in the generated polymethylaluminoxane composition, is not more 26 mol%” is not possible because the all of the methyl groups in the generated polymethylaluminoxane are all from trimethyl aluminum according to the disclosure of the specification.

Furthermore, the description of “Me(TMAL) amount of the resultant polymethylaluminoxane preparation determined by  $^1\text{H}$  NMR was 21.4 mol%” of Example 1 is somewhat confusing, since it is not clear what the mol% is based on.

B. Limitation of (iii) of claim 1

The limitation of thermal decomposition of an alkylaluminum compound having an aluminum-oxygen-carbon bond, the alkylaluminum compound being generated by a reaction between trimethylaluminum and toluic acid with toluene as a solvent to provide a polymethylaluminoxane composition with “an aluminum concentration of generated polymethylaluminoxane composition is in a range of from 9.1wt% to 9.4wt%” introduce in the Amendment filed February 19, 2009 is not fully supported by the application as originally filed. For example, Example 4 (pages 32-33) only supports aluminum concentration of 9.4 wt% of the obtained reaction mixture from the thermal decomposition of trimethylaluminum, benzoic acid, and toluene as solvent. It noted that benzoic acid does not support toluic acid, and the final reaction mixture and

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polymethylaluminoxane composition are not the same. Polymethylaluminoxane composition is only a part of the final reaction mixture, it does not include the solvent and other by products in the reaction mixture. For the same rationale, Comparative Example 5 also does not support the aluminum concentration end point of 9.1 wt%.

***Claim Rejections - 35 USC §103***

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as obvious over Smith et al. (US 5,831,109).

Smith's Examples 2 and 4 demonstrate the preparation of the polymethylaluminoxane (PMAO) composition substantially free of trimethylaluminum (TMAI) by reacting TMAI and benzoic acid in toluene with optional catalytic amount of polyaluminoxane (PMAO). It is noted that Smith does not expressly disclose the viscosity of the PMAO prepared from the Examples. However, in Smith's PMAO preparation process, the reaction between TMAI and benzoic acid is quantitative, therefore, the molecular weight of PMAO can be controlled by varying the ratio of TMAI to benzoic acid. As the TMAI/benzoic acid increases, the molecular weight of PMAO decreases. It is noted that the ratios of TMAI/O of benzoic acid in Smith's Examples 2 and 4 are 1.27 and 1.25 respectively, which are about the same as the TMAI/O ratio of 1.26 of applicants' Example 5. One would have expected the molecular weight of Smith's PMAO to be inherently identical or substantially identical to that of applicants' Example 5. As shown in applicants' Remark of February 19, 2009, the aluminum

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concentrations of the generated PMAO reaction mixture are 3.25 wt% and 15.5 wt% for Smith's Examples 2 and 4 respectively, apparently, the amount of toluene solvent used in the PMAO preparation process is not crucial, as long as enough is used to keep all of the reactants and product in solution and at least the amount of toluene can be adjusted to provide the aluminum concentration of the generated PMAO reaction mixture ranging from 3.25 wt% to 15.5 wt%. Therefore when suitable amount of toluene is used in the polymethylaluminoxane preparation process, the aluminum concentrations of the generated PMAO reaction mixture can be adjusted to about 9 wt% in the reaction media, and the corresponding viscosity of PMAO product mixture would be expected to inherently about  $2.0 \times 10^{-3}$  Pa·sec at 40°C because such a PMAO composition is substantially identical to that of applicants' Example 5.

It is noted that Smith does not expressly use toluic acid; however, Smith does expressly disclose that non-limited carboxylic acid can be used in the in the PMAO preparation process. It would been obvious to use any carboxylic acid such as toluic acid in the PMAO preparation process since toluic acid is inexpensively commercially available and have very good solubility in toluene.

Thus, it would have been obvious to a skilled artisan at the time the invention was made to modify Smith's disclosure of Examples 2 and 4 by replacing toluic acid with benzoic acid and using suitable amount of toluene to provide PMAO reaction mixture with aluminum concentrations of the generated PMAO reaction mixture adjusted to about 9 wt% in the reaction media since such is within the scope of Smith's teaching and in the absence of any showing criticality and unexpected results.

***Response to Arguments***

7. Applicant's arguments and Declaration filed June 19, 2009 have been fully considered.

Applicant's Declaration is deficient. First of all, the alkylaluminum compound is generated by a reaction between trimethylaluminum and toluic acid while the comparison examples disclosed in the Declaration are all about the alkylaluminum compound is generated by a reaction between trimethylaluminum and benzoic acid. Secondly, Runs 1 and 3 (representative of Smith's Example 2) were not conducted with the same steps as Smith's Example 2. Thirdly, the stability test of Run 3 (representative of Smith's Example 4) fails to show that the undiluted sample with 13.31 wt%-Al is less stable. All that disclosed is that the observed viscosity gradually increased so that the solution became a syrup-like solution and no time frame is provided.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caixia Lu whose telephone number is (571) 272-1106. The examiner can normally be reached on 9:00 a.m. to 5:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Caixia Lu/  
Primary Examiner  
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